

Occurrence.—Blackriveran (Benbolt formation), Rye Cove, Scott County, Va.

Holotype.—U. S. N. M. no. 113308.

Strimplecystis, n. gen.

Characters as in the specific description. Named in honor of Melba and Harrell Strimple.

Genotype, *S. oklahomensis*, n. sp.

Strimplecystis oklahomensis, n. sp. Fig. 19

Type and only specimen, a fragment of a calyx of many rather large radially arranged plates each pierced by a dozen or more diplopores much as in *Eumorphocystis* Branson and Pack, 1940, but differing in still preserving two short, unbranched food grooves out of probably five, each lined with a series of thin flat plates serving as brachioles. The rest of the specimen is such a jumble of plates that additional examples are necessary for more information. The tentative position assigned above seems the best under the circumstances.

Occurrence.—Blackriveran (Bromide formation, 140 feet below top), Oklahoma State Highway 99, Sec. 22, T. 1 N., R. 6 E., Oklahoma.

Holotype.—U. S. N. M. no. 115193.

Class CARPOIDEA Jaeckel 1900

Family ANOMALOCYSTITIDAE Bassler, 1943

Kirkocystis, n. gen. Figs. 15, 16

This new generic name, proposed in honor of Dr. Edwin Kirk, is based upon a carpoid related to *Enoploura* but differing in that the theca is composed of only two large elongate plates on the convex side and three equally long plates on the concave side. Typical *Enoploura* develops three plates in both the marginal and middle series of both sides: The surface ornamentation of small distinct papillae separated by very minutely reticulated spaces is another feature of *Kirkocystis*.

Genotype, *Enoploura? papillata* Bassler, 1943 (Amer. Journ. Sci. **241**: 695, pl. 1, figs. 3-5. 1943).

Occurrence.—Blackriveran (40' below top Bromide formation), Rock Crossing, Criner Hills, Sec. 35, T. 5S., R. 1 E., Oklahoma.

Cotypes.—U. S. N. M. no. 113105.

PALEONTOLOGY.—*New stropheodontid brachiopods*.¹ ALWYN WILLIAMS, Glasgow University. (Communicated by G. A. Cooper.)

The following descriptions are part of a recently completed morphological and systematic study of stropheodontid Brachiopoda of North America and Europe. The proposed systematic revision will be used in a forthcoming publication on British Silurian brachiopods and is here given in outline because the results as a whole will not be in print for some time.

Most of the types are located at the U. S. National Museum, and I take this opportunity to express my deep appreciation to the authorities of the Smithsonian Institution for making all their collections available to me, and my grateful thanks to Dr. G. Arthur Cooper, curator of invertebrate paleontology and paleobotany, for helpful criticism and advice during my investigations.

Family STROPHEODONTIDAE Caster

Hercostrophia, n. gen. Figs. 1-6

Exterior.—Transversely semioval, gently concavo-convex to almost biplanate. Pseudodeltid-

ium entire with a narrow median fold, chilidium vestigial. Ornamented by finely parvicostellate ribbing with accentuated primaries.

Ventral interior.—Hinge-line denticulate for about three-quarters its length. Diductor scars elongate, divergent, each contained by an outer and inner lateral, obtusely triangular ridge, the apices of which meet posterolaterally to form a narrow ring of shell deposit around each scar. Adductor scars fine, lanceolate, impressed posteriorly on either side of a low median ridge.

Dorsal interior.—Cardinal process lobes disjunct, socket plates vestigial. Adductor scars faintly impressed posteriorly to two pairs of ridges, an inner tuberculate pair, and an outer, low, somewhat indistinct pair.

Genotype.—*Hercostrophia alpenensis*, n. sp.

Range.—Middle Devonian.

Discussion.—The new genus includes an American group of shells presumably divergent from the shalerid stock. These forms differ from their shalerid contemporaries in the encirclement of the diductor muscle scars by the inward growth of the apices of the bounding ridges, the strong curvature to the outer bounding ridges, and the corresponding splayed flabellate appearance of

¹ Received May 17, 1950.

the diductor scars, and in the discrete nature of the inner pair of ridges in the dorsal valve.

Hercostrophia alpenensis, n. sp. Figs. 2, 4

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116017.....	1.0	1.4
Paratype: U.S.N.M. No. 116018.....	0.9	1.2
Paratype: U.S.N.M. No. 116019a.....	1.1	1.7

Sample population (length, width, in centimeters).—0.6, 0.8; 0.6, 0.8; 0.9, 1.2; 0.9, 1.2; 0.9, 1.2; 1.0, 1.3; 1.0, 1.3; 1.0, 1.4; 1.0, 1.4; 1.0, 1.4; 1.1, 1.4; 1.1, 1.4; 1.1, 1.4; 1.2, 1.5; 1.1, 1.6; 1.1, 1.6; 1.2, 1.6; 1.2, 1.6; 1.2, 1.6; 1.2, 1.7; 1.3, 1.8; 1.4, 1.9.

Exterior.—Moderate size, transversely semi-oval, gently concavo-convex. Ventral interarea apsacline, pseudodeltidium entire, with a narrow median fold; dorsal interarea anacline, chilidium vestigial. Ornamented by a finely parvicostellate ribbing with strong primaries, and by strong concentric lines of growth.

Ventral interior.—Hinge-line denticulate for about three-quarter length. Process pits excavate, ventral process strong. Adductor scars finely impressed, diductor scars elongated, divergent, outer and inner lateral ridges meeting postero-centrally to form a pair of narrow rings; outer ridges, anterior to the rings, only slightly curved.

Dorsal interior.—Cardinal process lobes disjunct, attachment faces directed posteriorly. Socket plates vestigial strengthened by transverse band of secondary shell material. Medial ridge long and low. Adductor scars posterior to two pairs of lateral ridges, inner pair high, tuberculate, outer pair rather indistinct.

Type material.—Holotype, U. S. N. M. no. 116017; figured paratypes, U. S. N. M. nos. 116018, 116019a; unfigured paratypes, U. S. N. M. no. 116019.

Horizon and locality.—Alpena limestone, 30'–40' below top at Michigan Alkali Company Quarry, Alpena, Mich.

Hercostrophia robusta, n. sp. Figs. 1, 5

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116020.....	1.8	2.6
Paratype: U.S.N.M. No. 116021.....	1.5	2.4

Sample population (length, width, in centimeters).—1.2, 1.6; 1.2, 1.7; 1.3, 1.7; 1.6, 1.9; 1.5,

2.0; 1.6, 2.0; 1.6, 2.0; 1.5, 2.1; 1.5, 2.2; 1.6, 2.2; 1.6, 2.3; 1.8, 2.3; 1.8, 2.4; 1.9, 2.6.

Exterior.—Large, transversely semioval, very gently concavo-convex with a planate appearance. Ventral interarea apsacline, pseudodeltidium entire with a narrow median fold; dorsal interarea anacline, chilidium vestigial. Ornamented by a finely parvicostellate ribbing with strong primaries, and by concentric lines of growth.

Ventral interior.—Denticulate for about three-quarter length of hinge-line. Process pits excavate; ventral process strong. Adductor scars lanceolate, foliaceous. Diductor scars, divergent, splayed anteriorly, inner and outer lateral ridges to each scar strong, and forming a thin ring postero-centrally. Outer lateral ridges strongly curved anterior to the rings. Peripheral callus well developed.

Dorsal interior.—Unknown.

Type material.—Holotype, U. S. N. M. no. 116020; figured paratype, U. S. N. M. no. 116021; unfigured paratypes, U. S. N. M. no. 116022.

Horizon and locality.—3-foot shale on "Blue" bed; quarry at Silica, 2½ miles southwest of Sylvania, Ohio.

Discussion.—This species differs from *P. alpenensis* in (1) the consistently larger and stronger shells attained in maturity; (2) the almost planate disposition of the valves toward the periphery; (3) the pronounced curves to the outer lateral ridges bounding the diductor scars and the splayed nature of the scars themselves, and (4) the presence of a strong, low callus around the periphery.

Hercostrophia sp. Figs. 3, 6

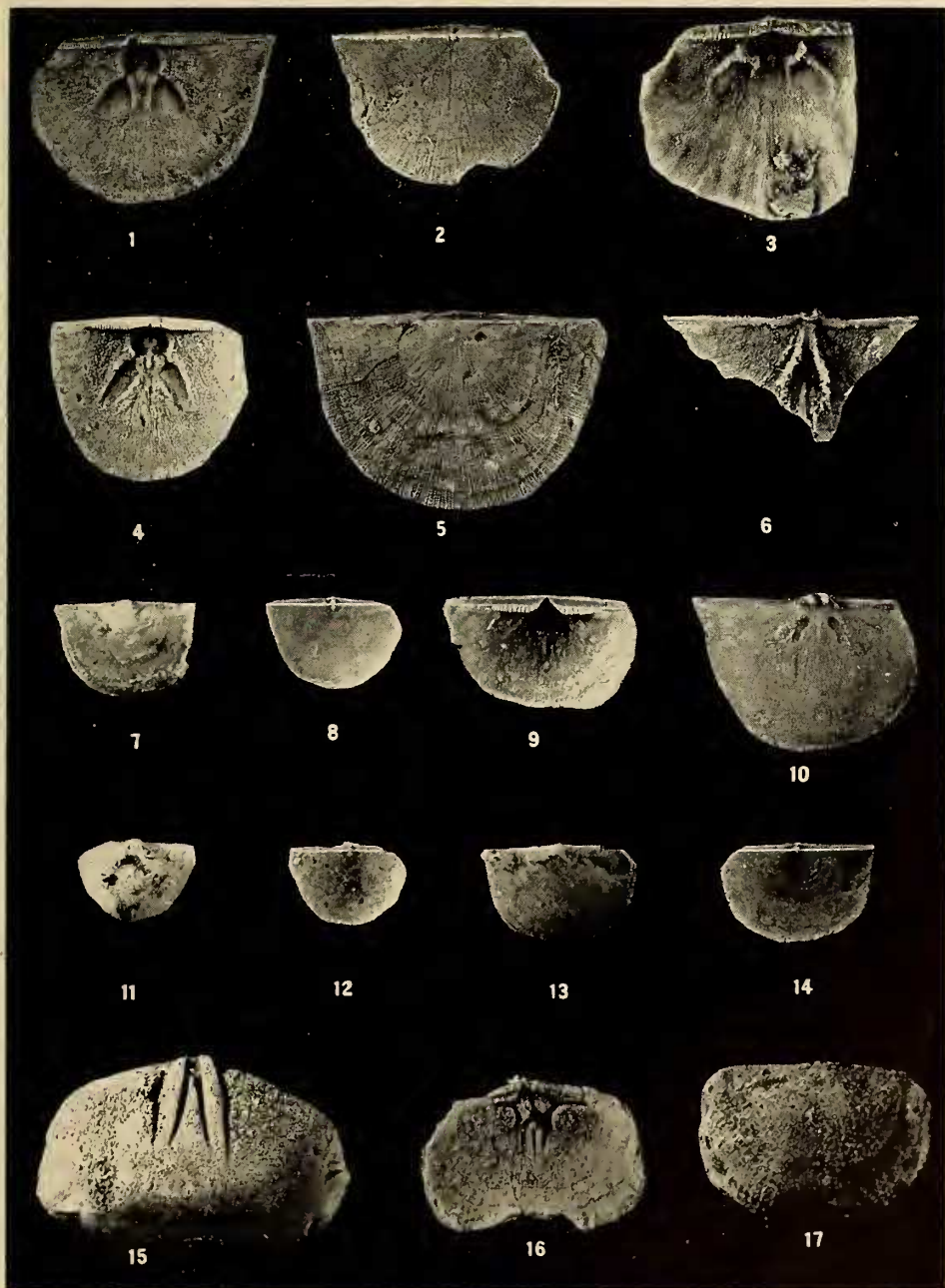
Specimens of an undescribed species often confused with *Dowillina* are figured for comparison with the Michigan and Ohio species. A fragmentary brachial valve shows details of the cardinalia.

Figured specimens.—U. S. N. M. no. 116034 a, b.

Horizon and locality.—Hamilton group, Canandaigua Lake, N. Y.

Pholidostrophia (*Mesopholidostrophia*), n. subg. Figs. 7–10

Silurian pholidostrophids possessing an incompletely developed pseudodeltidium, a prominent



Figs. 1, 5.—*Hercostrophia robusta*, n. sp.: 1, Ventral interior of paratype (U.S.N.M. no. 116021), $\times 2$; 5, dorsal view of complete shell of holotype (U.S.N.M. no. 116020), $\times 1\frac{1}{2}$.

Figs. 2, 4.—*Hercostrophia alpenensis*, n. sp.: 2, Dorsal view of almost complete shell of paratype (U.S.N.M. no. 116018), $\times 2$; 4, ventral interior of holotype (U.S.N.M. no. 116017), $\times 2$.

Figs. 3, 6.—*Hercostrophia* sp.: 3, Ventral interior of U.S.N.M. no. 116034a, $\times 2$; 6, dorsal interior of U.S.N.M. no. 116034b, $\times 2$.

Figs. 7-10.—*Pholidostrophia* (*Mesopholidostrophia*) *nitens*, n. subg. and sp.: 7, Ventral exterior of holotype (U.S.N.M. no. 116023), $\times 2$; 8, dorsal view of entire specimen, a paratype (U.S.N.M. no. 116024a), $\times 2$; 9, ventral interior of paratype (U.S.N.M. no. 116024b), $\times 3$; 10, dorsal interior of paratype (U.S.N.M. no. 116024c), $\times 3$.

Figs. 11, 12.—*Lissostrophia* (*Mesolissostrophia*) *minuta*, n. subg. and sp.: Ventral and dorsal views of an entire shell, holotype (U.S.N.M. no. 116028), $\times 2$.

Figs. 13, 14.—*Lissostrophia* (*Mesolissostrophia*) *pellicida*, n. subg. and sp.: Ventral and dorsal views of an entire shell, holotype (U.S.N.M. no. 116026), $\times 2$.

Figs. 15-17.—*Shaleria* (*Telacoshaleria*) *sulcata*, n. subg. and sp.: 15, Mold of ventral interior of paratype (U.S.N.M. no. 116031), $\times 2$; 16, mold of dorsal interior of paratype (U.S.N.M. no. 116023), $\times 1\frac{1}{2}$; 17, ventral interior of holotype (U.S.N.M. no. 116030), $\times 2$.

to vestigial chilidium, a conjunct to incipiently disjunct cardinal process, and progressively degenerate socket plates. Muscle scars pholidostrophid but not impressed.

Genotype.—*Pholidostrophia* (*Mesopholidostrophia*) *nitens*, n. sp.

Discussion.—Differs from *Pholidostrophia* (*Pholidostrophia*) Hall and Clarke (1892, p. 287), which is here emended to include only forms with a smooth pseudodeltidium, no chilidium, a disjunct cardinal process, no socket plates, and strongly impressed muscle scars.

Pholidostrophia (**Mesopholidostrophia**) **nitens**,
n. sp. Figs. 7-10

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116023.....	0.65	0.96
Paratypes: U.S.N.M. No. 116024a.....	0.6	0.9
U.S.N.M. No. 116024b.....	0.7	1.2
U.S.N.M. No. 116024c.....	0.65	1.0

Exterior.—Outline transversely semioval, mucronate, concavo-convex with a slight to moderate, even curvature to the valves. Ventral interarea apsacline, pseudodeltidium very small, dorsal interarea anacline, chilidium massive. Surface pseudonacreous, lamellose, free of radial ornamentation except for traces of fine primary costellae buried under the lamellose layer. Lamellose material heavily deposited toward the periphery to break the contour of the shells with concentric overlapping edges.

Ventral interior.—Hinge-line denticulate for less than half the length. Process pits very lightly impressed. Ventral process faintly developed. Adductor scar lanceolate impressed posteriorly and divided medianly by a very fine septum, diductor scars subcircular feebly impressed.

Dorsal interior.—Cardinal process lobes slender, socket plates small. Notothyrial platform virtually absent, adductor scars lightly impressed subquadrate contained posterolaterally by bounding ridges and divided by a feeble median ridge.

Type material.—Holotype, U. S. N. M. no. 116023; figured paratypes, U. S. N. M. nos. 116024a-c; unfigured paratypes, U. S. N. M. no. 116025.

Horizon and locality.—"Gotlandian," brickyard near Klintehamn, Gotland.

Discussion.—The large amount of excellent material available at the U. S. National Museum indicates that this stock is fairly common in the Middle Silurian "shales" of Gotland, but so far

as I am aware it has not been described. For purposes of close comparison between this species and any other undescribed material that exists, the following measurements of a U. S. N. M. sample are given (length of the shell followed by width of the shell at the hinge-line, in centimeters): 0.79, 1.25; 0.69, 1.00; 0.60, 0.94; 0.69, 1.00; 0.45, 0.69; 0.63, 0.97; 0.47, 0.63; 0.75, 1.10; 0.79, 1.10; 0.46, 0.79; 0.63, 0.94; 0.59, 0.72; 0.60, 0.87; 0.46, 0.69; 0.63, 1.00; 0.50, 0.90; 0.45, 0.79; 0.58, 0.91; 0.60, 0.91; 0.49, 0.85; 0.79, 1.06; 0.60, 1.10; 0.60, 1.00; 0.25, 0.35; 0.17, 0.25.

Lissostrophia (**Mesolissostrophia**), n. subg.
Figs. 11-14

Erected to include Lower Silurian lissostrophids with an incompletely developed pseudodeltidium, a strong to vestigial chilidium, conjunct to incipiently disjunct cardinal process, abbreviated to obsolescent socket plates, and faintly impressed lissostrophid muscle scars.

Genotype.—*Lissostrophia* (*Mesolissostrophia*) *pellucida*, n. sp.

Discussion.—Differs from *Lissostrophia* (*Lissostrophia*) Amsden, 1949 (p. 202), which is here emended, in that the latter subgenus embraces forms with a smooth pseudodeltidium, no chilidium, a disjunct cardinal process, no socket plates, and strongly impressed muscle scars.

Lissostrophia (**Mesolissostrophia**) **pellucida**, n. sp.
Figs. 13, 14

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116026.....	0.7	1.1
Paratypes: U.S.N.M. No. 116027a.....	0.7	1.1
U.S.N.M. No. 116027b.....	0.64	0.94

Exterior.—Rather small, transversely oval in outline, mucronate, concavo-convex with a low curvature to the valves. Ventral interarea apsacline, pseudodeltidium incipient, dorsal interarea anacline, chilidium large. Shell smooth, pellucid, ornamented only by fine concentric lines of growth.

Ventral interior.—Denticulate for a short distance on each side of the delthyrium. Process pits faintly excavate, ventral process incipiently developed, muscle scar obscure.

Dorsal interior.—Cardinal process lobes elongated conjunct, socket plates abbreviated, adductor scars obscure, median ridge low.

Type material.—Holotype, U. S. N. M. no. 116026; paratypes, U. S. N. M. nos. 116027a, b.

Horizon and locality.—"Gotlandian," brickyard near Klintehamn, Gotland.

Lissostrophia (Mesolissostrophia) minuta, n. sp. Figs. 11, 12

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116028.....	0.4	0.6
Paratypes: U.S.N.M. No. 35649a.....	0.42	0.52
U.S.N.M. No. 116029a.....	0.38	0.4

Exterior.—Very small, elongately oval in outline, mucronate, concavo-convex with a high degree of curvature. Shell smooth, pellucid, ornamented by a few concentric growth lines. Ventral interarea apsaeline, pseudodeltidium incipient, dorsal interarea anaeline, chilidium large, convex.

Interiors unknown.

Type material.—Holotype, U. S. N. M. no. 116028; paratypes, U. S. N. M. nos. 35649, 116029a.

Horizon and locality.—Waldron shale, Newsum, Tenn.

Shaleria (Telaeshaleria), n. subg. Figs. 15-17

Devonian shalerids with an entire pseudodeltidium folded medianly, vestigial chilidium, divergent ventral muscle scars with the median septum bifurcated posteriorly dorsal muscle scar platform elevated with the anterior parts of the outer ridges indistinct and the inner plates fused posteriorly.

Genotype.—*Shaleria (Telaeshaleria) sulcata*, n. sp.

Discussion.—The Silurian and early Devonian shalerids included in *Shaleria (Shaleria)* Caster, 1939 (p. 33), emended differ from these end stock members in having an incompletely developed pseudodeltidium, a strong to weak chilidium, ventral muscle scars lying parallel to each other with the median septum bifurcated posteriorly, and a weakly developed dorsal muscle scar platform with the four anterior ridges strong and discrete.

Shaleria (Telaeshaleria) sulcata, n. sp.

Figs. 15-17

Dimensions (in centimeters).—

	Length	Width
Holotype: U.S.N.M. No. 116030.....	1.1	1.6 (est.)
Paratypes: U.S.N.M. No. 116033a.....	1.3	2.0
U.S.N.M. No. 116032.....	1.2	1.8

Exterior.—Moderate size, subquadrate, moderately concavo-convex, slightly geniculate, dor-

sal and ventral valves with a complementary fold and sulcus anteromedianly. Ventral interarea apsaeline, pseudodeltidium entire but with narrow fold; dorsal interarea anaeline, chilidium obsolete. Ribbing finely parvicostellate with strong rather widely spaced primaries.

Ventral interior.—Hinge-line denticulate for the entire length of the body chamber. Diductor scars narrow, long, divergent, bounded laterally by high septa the inner pair of which resulted from the posterior bifurcation of the median septum. Adductor scars narrow, small, impressed posteriorly on either side of the median septum.

Dorsal interior.—Cardinal process lobes disjunct socket plates vestigial. Adductor scars subcircular deeply impressed and contained by coalescence of four ridges, the inner pair of which extend anteriorly beyond the platform, parallel to each other and separated by a small thin median ridge.

Type material.—Holotype, U. S. N. M. no. 116030; figured paratypes, U. S. N. M. nos. 116031, 116032; unfigured paratypes, U. S. N. M. nos. 116033.

Range.—Middle Devonian (Calceola beds).

Type locality.—Lissingen, Eifel, Germany.

Douvillina (Mesodouvillina), n. subg.

Erected to include Silurian douvillinids with an incompletely developed pseudodeltidium, prominent to vestigial chilidium, conjunct to incipiently disjunct cardinal process, short socket plates, no anterior bounding ridges to the ventral muscle scar, and poorly defined braceplates occurring as a pair of low ridges anterior to the dorsal muscle scar.

Genotype.—*Brachprion subinterstitialis serentensis* Kozłowski (1929, pp. 96-99, figs. 28-29; pl. 4, figs. 1-7).

Discussion.—*Douvillina (Douvillina)* Oehlert, 1887 (p. 1282), is here restricted to those Devonian forms in which the pseudodeltidium is entire but folded medianly, the chilidium and socket plates obsolete, the cardinal process disjunct, the ventral muscle scars progressively contained by strong lateral and anterior bounding ridges, and well developed braceplates. These are the essential differences between the two subgenera.

Strophonella (Eostrophonella), n. subg.

Erected to include lower Silurian strophonellids with dental plates supporting the denticulate

zone of the hinge-line, an incipiently developed pseudodeltidium, platelike cardinal process lobes, long divergent socket plates, and a subcircular ventral muscle scar.

Genotype.—*Strophonella davidsoni* Hortedahl, 1916 (pp. 64–65, pl. 7, figs. 6, 7).

Discussion.—*Strophonella* (*Strophonella*) Hall, 1879 (p. 152), is here restricted to include forms characterized by having no dental plates, a progressively developed pseudodeltidium stout cardinal process lobes, short to obsolescent socket plates and a petaloid ventral muscle scar. These are the essential differences between the two subgenera.

Glossostrophia, n. gen.

Exterior.—Transversely semioval; geniculately resupinate but with a narrow median zone of the geniculate portion projecting dorsally like a tongue. Pseudodeltidium entire with a narrow median fold, chilidium vestigial. Ornamented by fine parvicostellae with strong primaries.

Ventral interior.—Hinge-line denticulate for about three-quarters its length. Muscle scar subtriangular in outline, lateral bounding ridges strongly developed posterolaterally.

Dorsal interior.—Cardinal process lobes disjunct, socket plates robust, lying adjacent to the cardinal process lobes. Adductor scars suboval, contained laterally by a pair of high short ridges and anteriorly by a pair of low subcircular, elevated areas.

Genotype.—*Leptaena caudata* Schnur (1854, p. 224, pl. 42, fig. 4a–c).

Range.—Middle Devonian.

Discussion.—This genus is erected for a group

of resupinate forms, closely related to the leptostrophid-nervostrophid stock unique among all stropheodontids in possessing the dorsally projecting tongue-like process. One other resupinate group of this stock is known, namely, *Gamphalosis* Stainbrook (1945, p. 33). In addition to the difference cited above, *Gamphalosis* is ornamented in a nervate fashion as opposed to the parvicostellate type of *Glossostrophia*. No internal comparisons are possible because the interiors of *Gamphalosis* are unknown.

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BOTANY.—*Three new Carices from Mexico and Guatemala*. FREDERICK J. HERMANN.¹ U. S. Department of Agriculture.

Among an extensive collection of sedges made by Dr. A. J. Sharp in Mexico and Guatemala and an earlier collection made by Dr. C. H. Muller in Chihuahua the following undescribed species were found:

Carex percostata, sp. nov. (Multiflorae). Rhizomata crassa, lignea, memnonia, fibrillosa; culmi 3–6 dm alti, obtuse triangulares, infra capitulum scaberuli alibi laeves, foliis multo longiores; folia 3–6, ad basim culmi aggregata, vaginis ventral-

iter paulum ore productis, ligula brevi, lamini planis, rigidis, 1–3 dm longis, 3–4 mm latis, marginibus ad apicem attenuatum scabriusculis; capitulum late oblongum vel ovoideo-oblongum, 2–2.5 cm longum, 1–1.5 cm latum; spicae 7–12 androgynae, aggregatae vel infimae plus minusve disjunctae, ovoideae, perigyniis 5–8 adscendentibus patentibusve parte mascula conspicua; bracteae squamiformes vel infima setaceo-producta; squamae ovatae, acutae vel brevispidatae, perigyniis breviores; perigynia inaequaliter biconvexa, oblongo-ovoidea, 4–5 mm longa, 2.25–2.5 mm lata, fulvo-straminea apice brunnea,

¹ Received June 9, 1950.